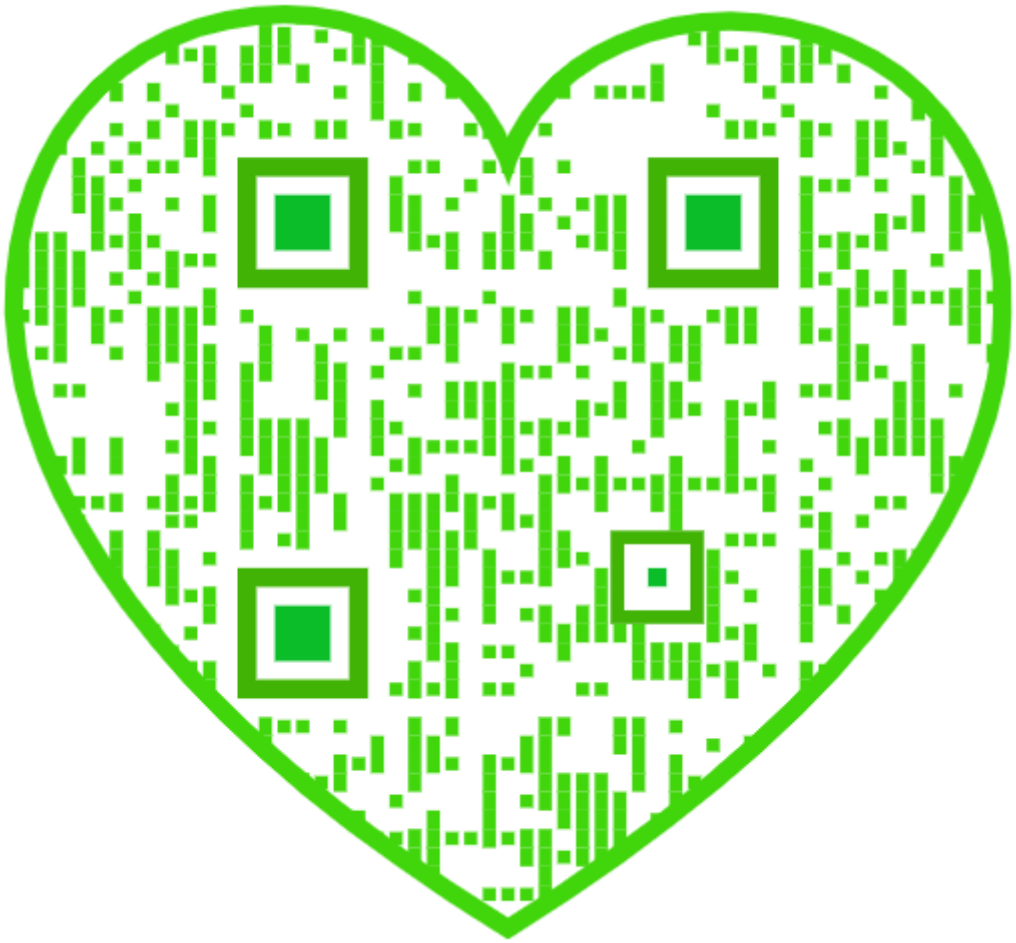
Master in Artificial Intelligence

Algorithm Selection & Development IV



Purpose

The purpose of the section is to help you learn how to research, select, and develop appropriate algorithms to become a Successful Artificial Intelligence (AI) Engineer

At the end of this lecture, you will learn the following

- **How does Silhouette Score measures how similar an object is to its own cluster compared to other clusters**

How to determine type of output and evaluation metrices?

Understand the problem

- Domain
- Objectives
- Constraints

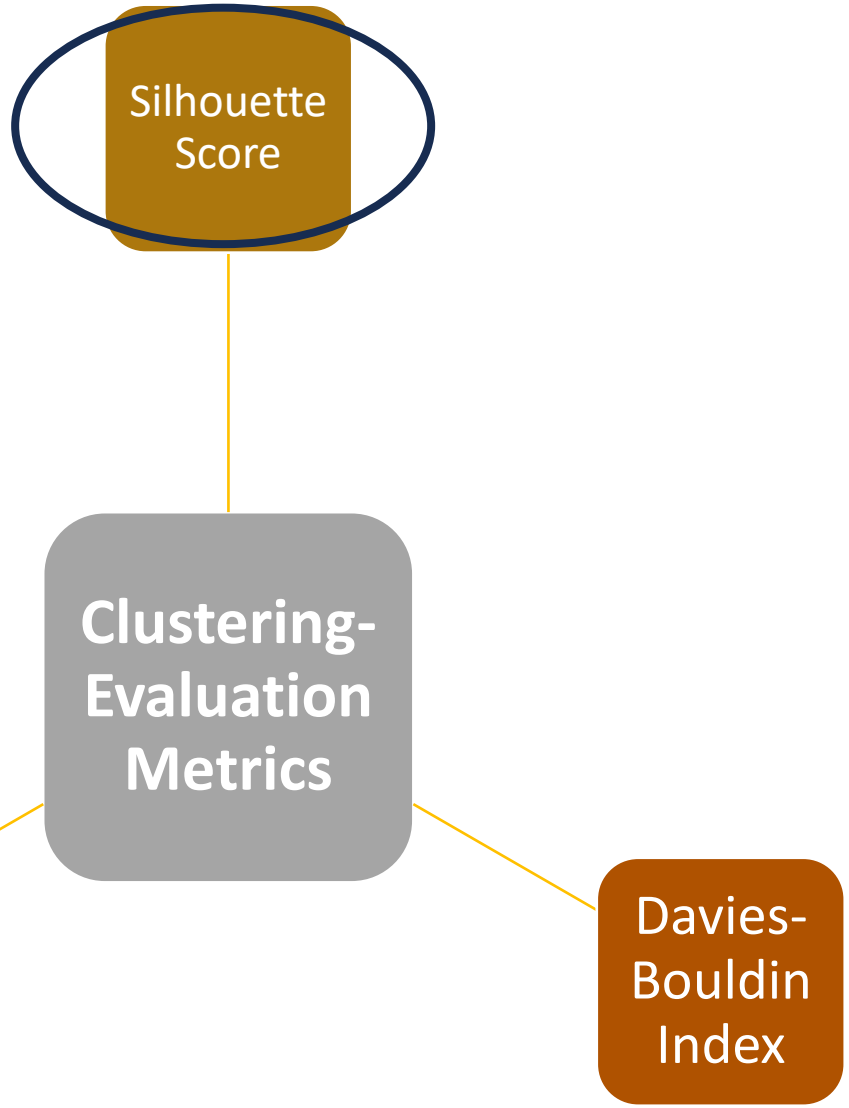
Define the problem as a

- Supervised
- Unsupervised
- Reinforcement learning task

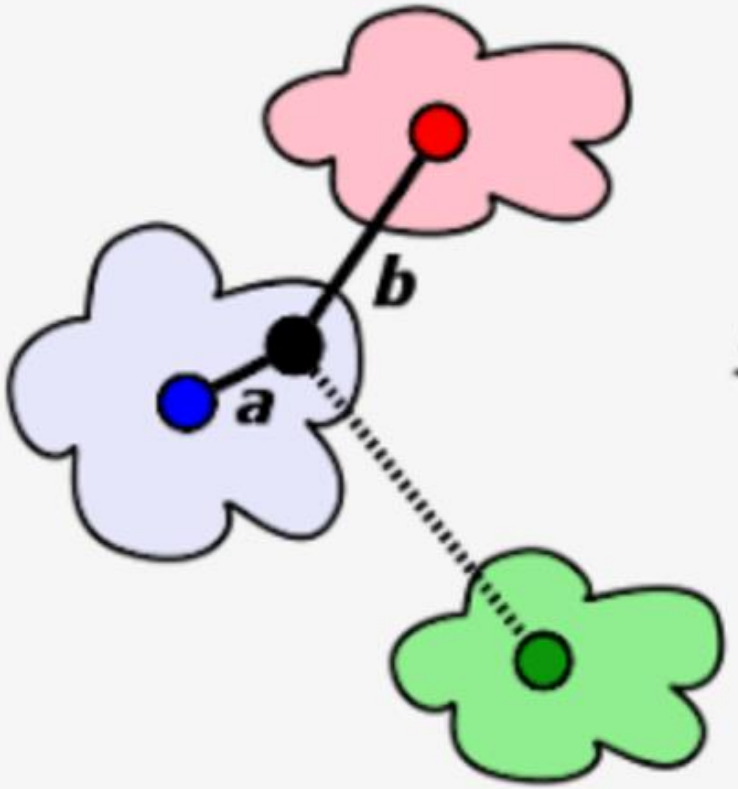
Determine

- type of output (e.g., classification, regression, clustering)
- Evaluation metrics

How does Silhouette Score measures how similar an object is to its own cluster compared to other clusters



Calculating the Silhouette Score



$$SSI_i = \frac{b_i - a_i}{max(a_i, b_i)}$$

Interpreting the Silhouette Score

High silhouette score	Object is well-matched to its own cluster and poorly-matched to neighboring clusters
Silhouette score close to 0	Object is on or very close to the decision boundary between two neighboring clusters
Negative silhouette score	Object may have been assigned to the wrong cluster, as it is more similar to neighboring clusters than to its own cluster

Using the Silhouette Score for Cluster Evaluation

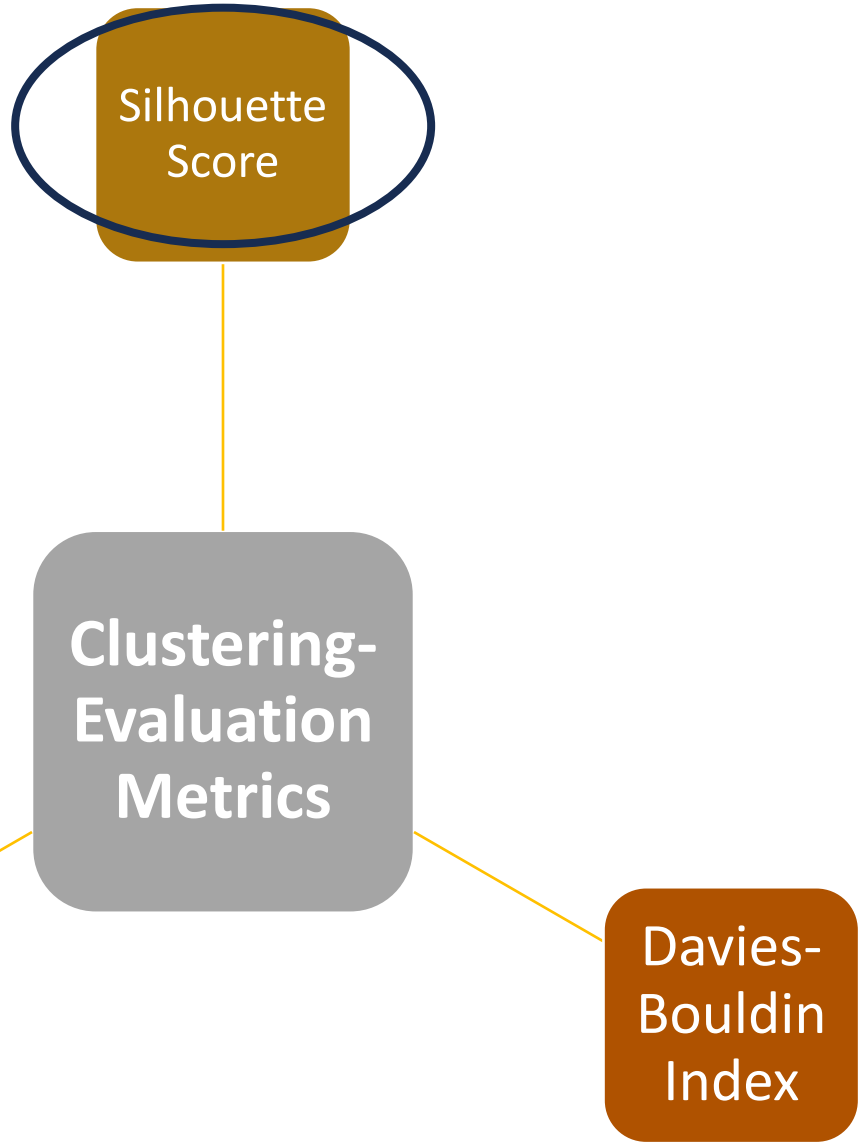
A high average silhouette score

Clusters are dense and well-separated, with clear boundaries between them

A low average silhouette score

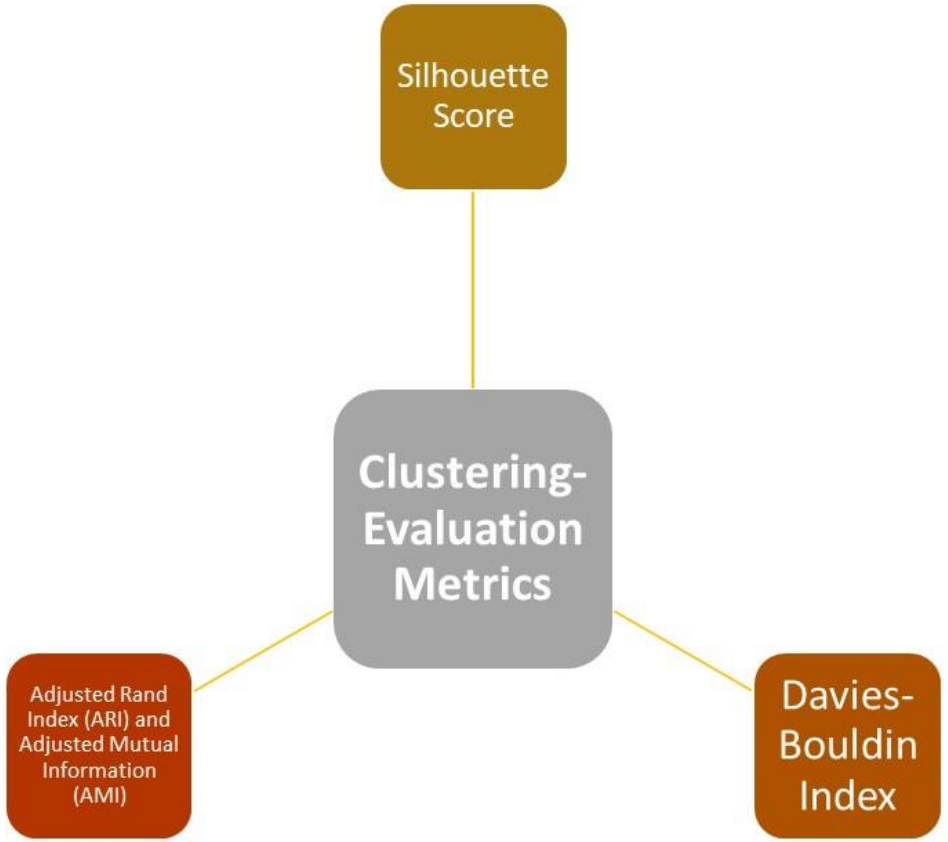
Clusters are overlapping or poorly-defined

How does Silhouette Score measures how similar an object is to its own cluster compared to other clusters



What is next?

How does Davies-Bouldin Index compute the average similarity between each cluster and its most similar cluster



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